

REMARKS

This is intended as a full and complete response to the Final Office Action dated December 29, 2004, having a shortened statutory period for response set to expire on March 29, 2005. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1, 4-24 and 74-109 remain pending in the application. Claims 1, 4-24 and 74-109 stand rejected. Claims 1, 11, 74, and 96 have been amended to correct informalities. Reconsideration of the rejected claims is requested for reasons presented below.

Claim Rejections – 35 USC § 103

Claims 1 and 4-10 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent Publication No. 20020068458A1 (*Chiang et al.*), in view of U.S. Patent Publication No. 20020081855A1 (*Jiang et al.*). Applicant respectively traverses the rejection.

Chiang et al. discloses a method to perform an in-situ cleaning and surface treatment step applied to a substrate surface prior to an ALD deposition process for depositing a tantalum or titanium barrier layer. As stated in paragraph 13 of *Chiang et al.*, the cleaning and surface treatment step is performed with either a halogen or hydrogen containing radical alone, or preferably with simultaneous halogen or hydrogen containing radical and low energy ion bombardment of the substrate to form argon ions 177 and halogen or hydrogen containing radicals 176 (Figure 1). *Chiang et al.* does not teach, show, or suggest forming an organosilicate layer or treating a substrate with a plasma prior to forming an organosilicate layer.

Jiang et al. discloses the use of an in-situ oxygen (O₂) plasma ash and treatment step to reduce or eliminate resist poisoning on a substrate surface after a photoresist patterning step. As stated in paragraph 13 of *Jiang et al.*, alternative chemistries for the plasma ash step may be H₂, H₂O, H₂O₂, O₃, CO, CO₂, SO₂, etc. with or without gas additive like Ar or He.). *Jiang et al.* does not teach, show, or suggest forming an

organosilicate layer or treating a substrate with a plasma prior to forming an organosilicate layer.

Chiang et al. in view of *Jiang et al.*, alone or in combination, do not teach, show, or suggest forming an organosilicate layer. In addition, *Chiang et al.* in view of *Jiang et al.*, alone or in combination, do not teach, show, or suggest treating a substrate with a plasma prior to forming an organosilicate layer by applying an electric field to a gas mixture comprising molecular oxygen (O₂) and molecular hydrogen (H₂) to the substrate.

Therefore, *Chiang et al.* in view of *Jiang et al.*, alone or in combination, do not teach, show, or suggest treating a substrate with a plasma prior to forming an organosilicate layer, wherein the plasma is generated in a reaction chamber by applying an electric field to a gas mixture comprising molecular oxygen (O₂) and molecular hydrogen (H₂); forming the organosilicate layer on the substrate; and treating the organosilicate layer with the plasma, as recited in claim 1 and claims dependent therefrom, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 11-24 and 74-109 stand rejected under 35 U.S.C. § 103(a) as being obvious over *Chiang et al.* and *Jiang et al.*, as applied to claims 1, 4-10 above, further in view of U.S. Patent Publication No. 20020142579A1 (*Vincent et al.*). Applicant respectively traverses the rejection.

Chiang et al. and *Jiang et al.* have been discussed above.

Vincent et al. discloses the use of organosilicon precursors having a silyl ether, or a silyl ether oligomer reactive group to form an interlayer dielectric film having a dielectric constant of 3.5 or less. *Vincent et al.* does not teach, show, or suggest treating a substrate with a plasma and forming an organosilicate layer on the substrate.

Vincent et al. does not teach, show, or suggest elements lacking in both *Chiang et al.* and *Jiang et al.* In addition, *Chiang et al.* in view of *Jiang et al.*, further in view of *Vincent et al.*, alone or in combination, do not provide motivation to combine the teachings.

Therefore, *Chiang et al.* in view of *Jiang et al.*, alone or in combination, do not teach, show, or suggest treating a substrate with a plasma prior to forming an

organosilicate layer, wherein the plasma is generated in a reaction chamber by applying an electric field to a gas mixture comprising molecular oxygen (O_2) and molecular hydrogen (H_2); forming the organosilicate layer on the substrate; and treating the organosilicate layer with the plasma, as recited in claim 1 and claims dependent therefrom, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

With regard to the Examiner's Response to Applicants' arguments filed previously, Applicants respectfully request the Examiner to reconsider the Declaration under 37 C.F.R. § 1.132, submitted on April 30, 2004, by Li-Qun Xia, and withdraw the rejections. As asserted by Li-Qun Xia, a person skilled in the art would realize the method described in the instant application will produce a plasma mixture containing both H-radicals (H) and O-radicals (O). Moreover, as asserted by Li-Qun Xia, a person skilled in the art of semiconductor wafer processing and, specifically, in the art of plasma treatment of materials would realize generating a plasma from H_2O_2 or H_2O is not equivalent to generating plasma from a gas mixture comprising molecular oxygen and molecular hydrogen. Thus, a person skilled in the art would not see a suggestion or applying plasma to molecular oxygen and molecular hydrogen based on teaching of applying plasma to H_2O_2 or H_2O .

Applicants believe that the claims have been amended to correct informalities and, as amended, are in condition for allowance. Reconsideration of the pending claims is requested in light of the Declaration and the arguments presented above.

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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